sanwa

ADAPTER UNITS FOR FX-110 TESTER

OPERATOR'S MANUAL

These two units are attached to the FX-110 tester to expand its measuring functions. One of the units, FU-1H, combines a TR (h_{FE}) meter having the function to measure the h_{FE} of transistors and a C (F) meter that is able to measure the capacity of capacitors. The other unit, FU-2R, unites a linear scale ohmmeter, which can read up to high resistances on graduations of the same intervals, and a low power ohmmeter, which is able to measure resistance values on semiconductor circuits in in-circuit condition.
Either or both of these units can be used with the FX-110 tester depending on your requirements.

Preparations for Measurement (Common for Both Units)

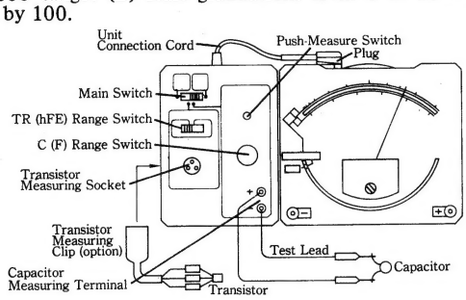
Switch the range of the FX-110 tester to EXT. (Remove the test leads from the plus and minus measuring terminals, and insert them into the measuring terminals of the unit. The leads are common to the tester and the units.)

Next insert the plug of the connection cord of the unit to be used into the EXT jack on the switch knob side of the tester.

TR (h_{FE}) – C (F) Meter Unit, FU-1H

(1) Measurement of Transistors (h_{FE})

a. Slide the main switch to TR (h_{FE}).
b. Turn the TR (h_{FE}) range switch to NPN or PNP of the transistor.
c. Then slide the switch to 1000.
d. Bundle and insert E, B and C (Emitter, Base and Collector) of the transistor.
e. Read the indication on (B) scale.
f. When the indicated value is smaller than 250, switch the TR (h_{FE}) range to 250 and read the indication.
   – In 250 range: (B) scale graduations from 0 to 250 are read directly.
   – In 1000 range: (B) scale graduations from 0 to 10 are multiplied by 100.



(Note) When the transistor has a special shape, acquire an optional CL-700 transistor measuring clip.
(Note) When the measured value differs from the catalog value, it is because of the difference in the operating condition as the basic checker function.
Base current is about 2.8μA and collector current is about 700μA in the 250 range and about 2.8mA in the 1000 range.

(2) Measurement of Capacitor C (F)

a. Turn the main switch to C (F).
b. Select the C (F) range according to the value of the capacitor to be measured.
c. Put the test pins at the tip of the test leads from the capacitor measuring terminals in contact with the capacitor leads.
d. Push the push-measure switch.
e. Read the indication on (B) scale.
   – In 1000pF range: (B) scale graduations from 0 to 10 are multiplied by 100.
   – In 0.01μF range: The same graduations are multiplied by1/1000.
   – In 0.1μF range: The same graduations are multiplied by 1/100.
   – In 1μF range: The same graduations are multiplied by 1/10.
   – In 10μF range: The same graduations are read directly.

(Note) In the case of 1000pF range only, do not use test leads but insert the capacitor to be measured directly into the measuring terminals.
(Note) In the case of a polarized capacitor, use the correct polarities of the measuring terminals.
(Note) Measuring frequency: About 350Hz (about 35Hz in the case of 10μF.) The pointer may sometimes vibrate a little.

Accuracy
In TR (h_{FE}) range:
NPN (250, 1000), PNP (250, 1000):
Within ±3% of the max. graduation.
IN C (F) range:
1000pF, 0.01μF, 0.1μF, 1μF, 10μF:
Within ±4% of the max. graduation.

Dimensions and Weight
103mm x 75mm x 40mm, weighing about 180g.

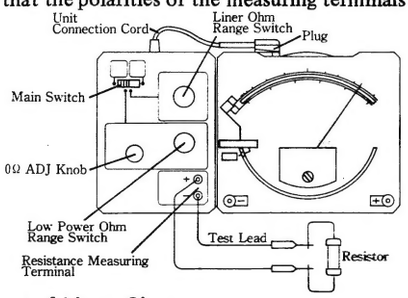
Accessories
– Equipped with the unit connection cord.
– One 006P 9V battery contained.
– One copy of instructions manual attached.

Ohmmeter Unit, FU-2R

(3) Measurement of Low Power Ohm

a. Turn the main switch to LOW POWER OHM.
b. Select the desired LOW POWER OHM range.
c. Insert the test leads into the resistance measuring terminals, then short the tip metals.
d. While keeping this condition, adjust the pointer to 0Ω graduation on the extreme right of the scale with the 0Ω ADJ knob.
e. Stop shorting the tip metals and apply the test pins to the measuring points.
f. Read the indication on (A) scale.
   – In X 1 range: (A) scale graduations are read directly.
   – In X 10 range: They are multiplied by 10.
   – In X 100 range: They are multiplied by 100.
   – In X 1k range: They are read directly (to get the value in kΩ unit.)

(Note) Each time the range is changed, make the 0Ω adjustment.
(Note) Since the measuring voltage is low, this unit is convenient also for measuring the resistances of fine wires of current capacities. The voltage applied is less than 100mV.
(Note) Note that the polarities of the measuring terminals are reversed.



(4) Measurment of Linear Ohm

a. Turn the LINEAR OHM range switch to 25MΩ range.
b. Touch the measuring points with the metals at the tips of the test leads.
c. Turn the main switch to LINEAR OHM.
d. Read the approximate indication (on (B) scale).
e. Switch the LINEAR OHM range to the optimum one.
f. Read the indication on (B) scale. (Turn power off and release the leads from the measuring points.)
   – In 250Ω range: (B) scale graduations from 0 to 250 are read directly.
   – In 2.5kΩ range: The same graduations are multiplied by 1/100 (for kΩ unit).
   – In 25kΩ range: The same graduations are multiplied by 1/10 (for kΩ unit).
   – In 250kΩ range: The same graduations are read directly (for kΩ unit).
   – In 2.5MΩ range: The same graduations are multiplied by 1/100 (for MΩ unit).
   – In 25MΩ range: The same graduations are multiplied by 1/10 (for MΩ unit).

Accuracy
Low Power Ohm:
X1, X10, X100, X1k ranges:
Within ±3% of the scale length.
Linear Ohm:
250Ω, 2.5kΩ, 25kΩ, 250kΩ, 2.5MΩ, 25MΩ
Within ±3% of the max. graduation (±4% for 25MΩ).

Dimensions and Weight
103mm x 75mm x 40mm, weighing about 180g.

Accessories
– Equipped with the unit connection cord.
– One 006P 9V battery contained.
– One copy of instructions manual attached.

(5) Self-Check of Inside Battery (Common for Both Units)

a. Turn the main switch to BATT CHK range.
b. Read the indication.
   * The full scale represents 10V. If the indication is smaller than 7V, replace the 006P 9V battery contained in the unit.
c. How to replace the battery:
   (1) Remove the rear case locking screw (on the back side) with a screwdriver.
   (2) Remove the rear case.
   (3) Take out the battery from its holder.
   (4) Insert a new battery into the holder.
   (5) Reinstall the rear case and lock it with the screw to complete the replacement.

CAUTIONS

After the completion of each measurement, be sure to return the main switch to POWER OFF position to prevent wasting battery.
Take care not to apply by accident any voltage or current to the measuring terminals of the unit.

* The tolerances are for the respective units only.
* Clip adapters TL-12 (black) and TL-12R (red), which are very convenient for measurement, are available as optional accessories.

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